
California Debt and Investment Advisory Commission

Investing Public Funds: Fundamentals of Managing Your Portfolio

Investment Concept Fundamentals

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Basics of fixed income investing

Introduction

Bond market overview

Key terms

Pricing bonds

Introduction

- Broad overview of important topics
- Develop better understanding of portfolio management process
- Learn enough to know what questions to ask
- Focus on the key takeaways

Bond market overview

- Bond market exists to help governments, corporations and other borrowers intersect with capital providers
- Bonds are considered safer than stocks or many other assets
- Bonds are a science, stocks are an art
- Bonds trade over the counter - no central exchange
- Bond markets lack transparency
- Largely dominated by institutional investors

Key terms

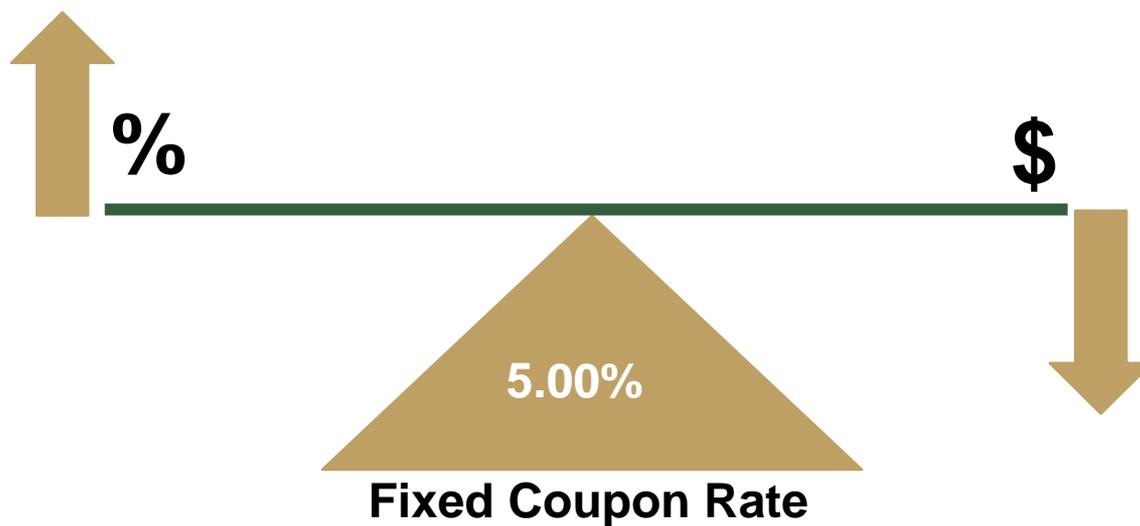
- Bond characteristics
 - Issuer
 - Maturity
 - Coupon
 - Rating
 - Price
 - Yield
- Callable or non-callable (bullet)?
- Basis point (1/100 of 1%)

GE 5.00% 11/15/11 - description

DES	Corp	DES
SECURITY DESCRIPTION		Page 1/ 1
GEN ELEC CAP CRP GE 5 11/15/11	94.86/96.19	(6.89/6.39) JEF
ISSUER INFORMATION	IDENTIFIERS	1) Additional Sec Info
Name GENERAL ELEC CAP CORP	Common 023763028	2) ALLQ
Type Diversified Finan Serv	ISIN US36962GT386	3) TRACE Trade Recap
Market of Issue Global	CUSIP 36962GT38	4) Corporate Actions
SECURITY INFORMATION	RATINGS	5) Cds Spreads/RED Info
Country US Currency USD	Moody's Aaa	6) Ratings
Collateral Type Sr Unsecured	S&P AAA	7) Custom Notes
Calc Typ(1)STREET CONVENTION	Composite AAA	8) Covenant/Default
Maturity 11/15/2011 Series		9) Identifiers
NORMAL	ISSUE SIZE	10) Fees/Restrictions
Coupon 5 Fixed	Amt Issued/Outstanding	11) Prospectus
S/A 30/360	USD 1,600,000.00 (M)/	12) Sec. Specific News
Announcement Dt 11/29/05	USD 1,600,000.00 (M)	13) Involved Parties
Int. Accrual Dt 12/ 2/05	Min Piece/Increment	14) Issuer Information
1st Settle Date 12/ 2/05	1,000.00/ 1,000.00	15) Pricing Sources
1st Coupon Date 5/15/06	Par Amount 1,000.00	16) Related Securities
Iss Pr 99.79400	BOOK RUNNER/EXCHANGE	17) Issuer Web Page
SPR @ ISS 64.40 vs T 4 ½ 11/10	LEH,UBS	65) Old DES
HAVE PROSPECTUS DTC	Multiple	66) Send as Attachment
SHORT 1ST CPN. ADD'L US\$600MM ISS'D 12/1/05 @ 99.552 EFF 12/6/05.		
<small>Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2008 Bloomberg Finance L.P. 20-Oct-2008 18:47:12</small>		

Source: Bloomberg L.P.

Yield & price inversely related



Framework for investing

Objectives: SLY

Investment policy

Cash flow forecasts

Economic analysis

Interest rate forecasts

Local agency investment objectives

- Primary objectives of local agency investing
 - Safety
 - Protect principle
 - Liquidity
 - Meet anticipated cash flow requirements
 - Since all possible demands cannot be anticipated, hold securities that have active secondary markets
 - Yield / Rate of Return
 - Earn a reasonable return relative to the risk being assumed

Why an investment policy?

- Defines the investment program
 - Legal & permitted activities
 - Who's responsible for the portfolio
 - Measurement of results
- Provides structure to investment program
- Dynamic process - can evolve over time

Why prepare a cash flow forecast?

- Projection of anticipated receipts & disbursements
- Ensures liquidity for disbursements
- Warns of impending budget problems
- Identifies short-term cash deficits
- Estimate of investable cash balances
 - Liquid funds
 - Core funds

Economic analysis

- The direction of the economy dictates the actions of the Federal Reserve
- The Federal Reserve decides the course of short term interest rates
- Understanding economic trends can help you understand why interest rates are at a general level and where they might be headed
- Understanding economic trends can help in more accurate budgeting and forecasting
- Economic indicators are the signposts of the nations economic health
 - Frequently the signs point in different directions
 - Economic forecasts to lead to tactical changes

Beware interest rate forecasts

Excerpts from presentation on July 19, 2007

- Most forecasters believe that the first quarter of 2007 saw a low point in the current economic cycle
- The general consensus is for continued moderate growth with moderate inflation, and a Fed on hold for most of this year

“The only function of economic forecasting is to make astrology look respectable.” - John Kenneth Galbraith, Economist

Types of securities

Treasury securities

Agency securities

Corporate securities

Pooled investment funds

Structured securities

Callable securities

Treasury securities

- Explicitly guaranteed by the United States government
- Safest and most liquid securities in the world
- Form a core component of high-quality fixed income portfolios
- Used as a benchmark against which other securities are compared
- Wide range of maturities available

Agency securities

- Supported by the United States government - AAA rated
- Considered very safe and liquid
- Include FNMA, FHLMC, FHLB, FFEB, TVA
- Available as callable or non-callable securities
- Available in a range of maturities and structures
- Discount notes

Corporate securities

- Issued by corporations of varying credit quality
- Commercial paper short-term less than 270 days
- Corporate bonds have maturities as long as 30 years
- Generally lower credit quality than Treasury or agency securities and less liquid
- Provide higher yields over time
- Require independent credit research and continuous monitoring

Pooled investment funds

- Examples include local government investment pools (LAIF) and money market mutual funds
- Many local agencies use pooled investment funds for liquidity needs
- Easy to use and provide instant diversification
- One drawback: you don't actually know what securities you own

Structured securities

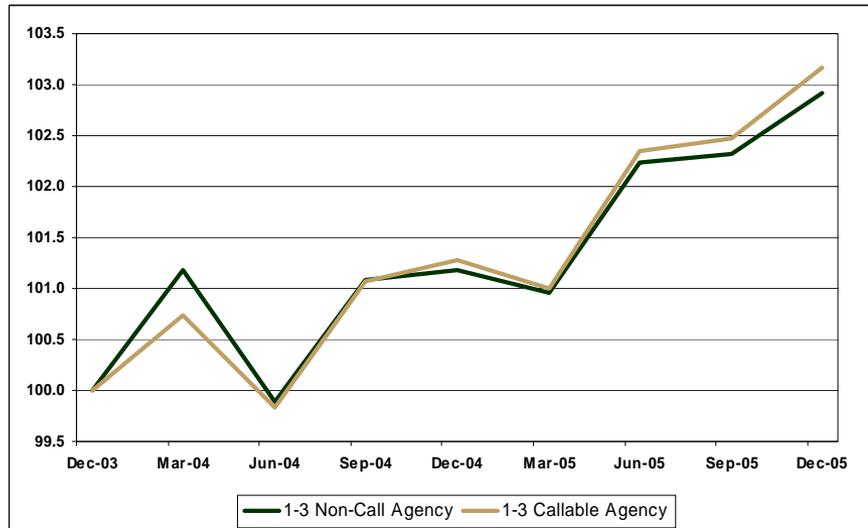
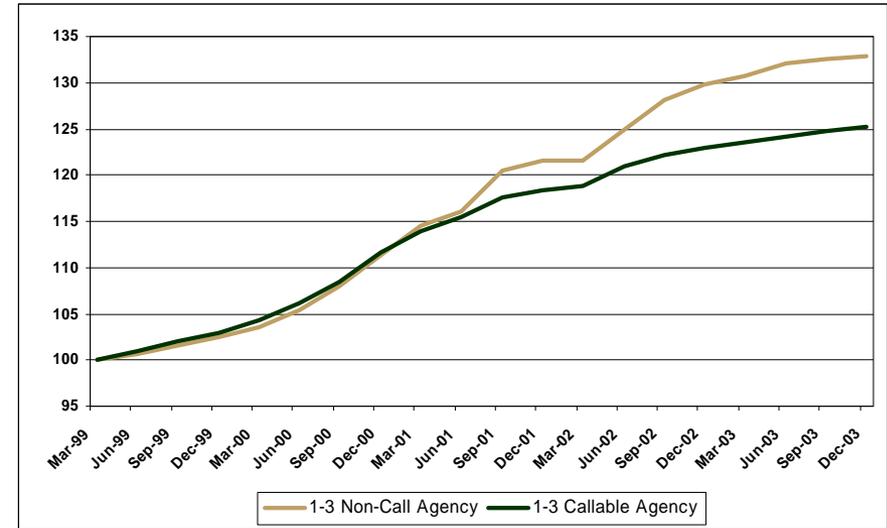
- Mortgage-backed securities
- Asset backed securities
- Floating-rate securities
- Callable bonds
 - Investor sells option to redeem bonds early to issuer

Callable securities

- When interest rates fall, callable securities tend to be called away by the issuer
 - Resulting in reinvestment at lower interest rates
- When interest rates fall, the duration of callable securities tends to decline
 - But longer duration portfolios perform better in falling rate environments
- When rates rise, callable securities are generally not called
 - Resulting in no opportunity for reinvestment at higher rates
- When rates rise, the duration of callables extends
 - Resulting in greater portfolio market value decline
- When rates are stable callable bonds tend to outperform non-callable structures

Reinvestment risk—callable securities

- In a period of falling rates, bullet securities, with higher duration and positive convexity, provide more growth than callables.



- But when rates are stable, or rise, callables, with their generally higher coupons, tend to outperform bullets.

Analyzing securities

Investment risks & rewards

Measuring yield

Spread measures

Portfolio management *is* risk management

- The greater an investor's exposure to properly diversified risk, the higher the expected return over time
- The greater an investor's exposure to risk, the higher the volatility of return from period to period
- The objective of “safety” requires establishing risk constraints
- Risk is something to be managed not avoided

Different types of risks

- Market Risk
- Liquidity risk
- Reinvestment risk
- Credit risk

Market risk

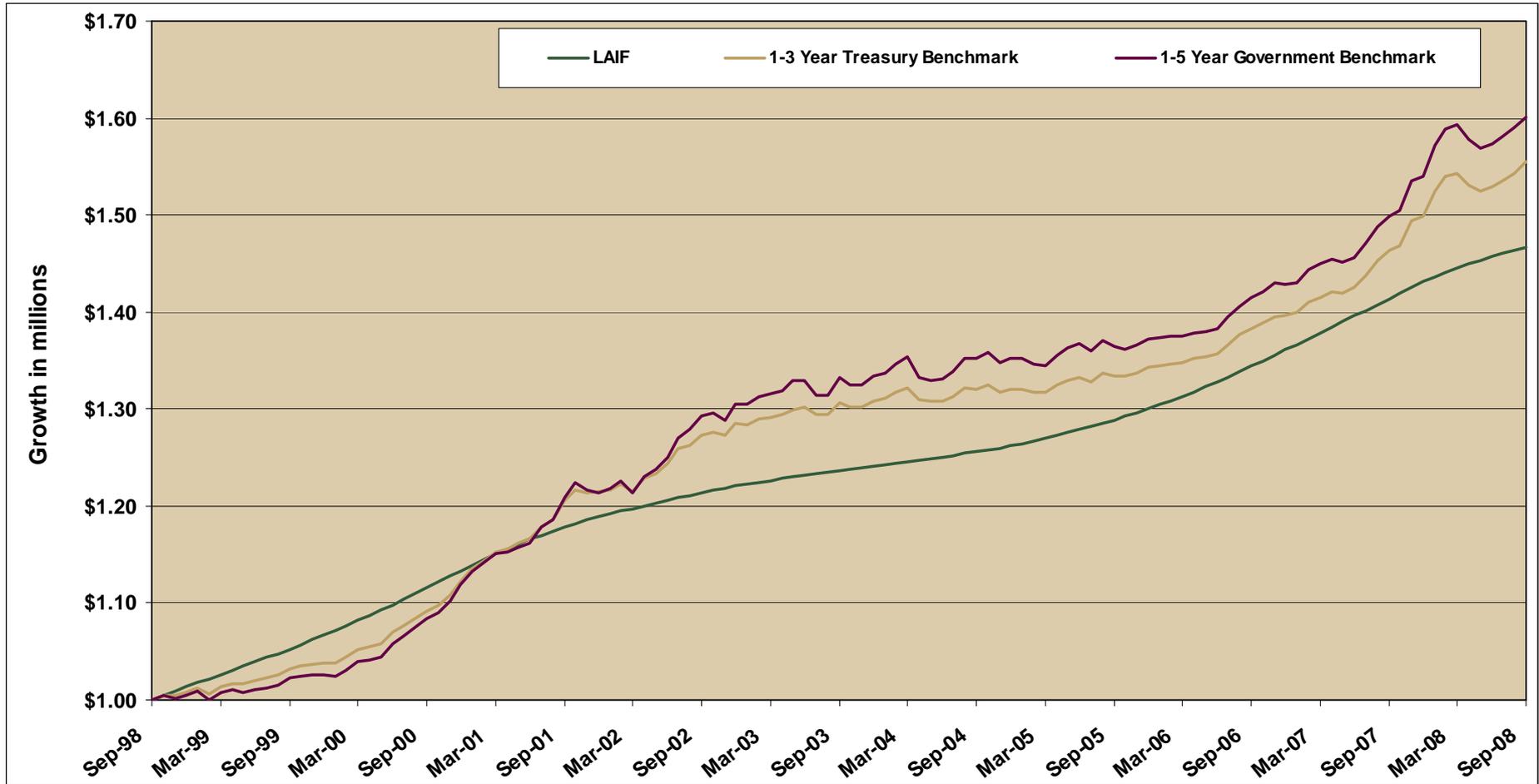
- Market risk
 - Also called interest rate risk
 - Securities prices change as interest rates change—in the opposite direction
- Modified duration measures the percent change in price of a security for a 1 percent change in yields
- We can't predict interest rates, but, using duration, we can calculate approximately how much the portfolio market value will change with a given, instantaneous change in interest rates
- The higher the duration, the greater the exposure to market risk

What is duration, anyway?

- **Portfolio size = \$50 million**
- Portfolio duration = 2
- Interest rate $\Delta = +2.25\%$
- Portfolio MV $\Delta = \$50 \text{ million} \times 2 \times 2.25\% \times -1 = \$50 \text{ million} \times -4.5\%$
- **MV $\Delta = (\$2,250,000)$**
- Interest rate $\Delta = -2.25\%$
- Portfolio MV $\Delta = \$50 \text{ million} \times 2 \times (2.25\%) \times -1 = \$50 \text{ million} \times +4.5\%$
- **MV $\Delta = +\$2,250,000$**

- **Portfolio size = \$50 million**
- Portfolio duration = 1
- Interest rate $\Delta = +2.25\%$
- Portfolio MV $\Delta = \$50 \text{ million} \times 1 \times 2.25\% \times -1 = \$50 \text{ million} \times -2.25\%$
- **MV $\Delta = (\$1,125,000)$**
- Interest rate $\Delta = -2.25\%$
- Portfolio MV $\Delta = \$50 \text{ million} \times 1 \times (2.25\%) \times -1 = \$50 \text{ million} \times +2.25\%$
- **MV $\Delta = +\$1,125,000$**

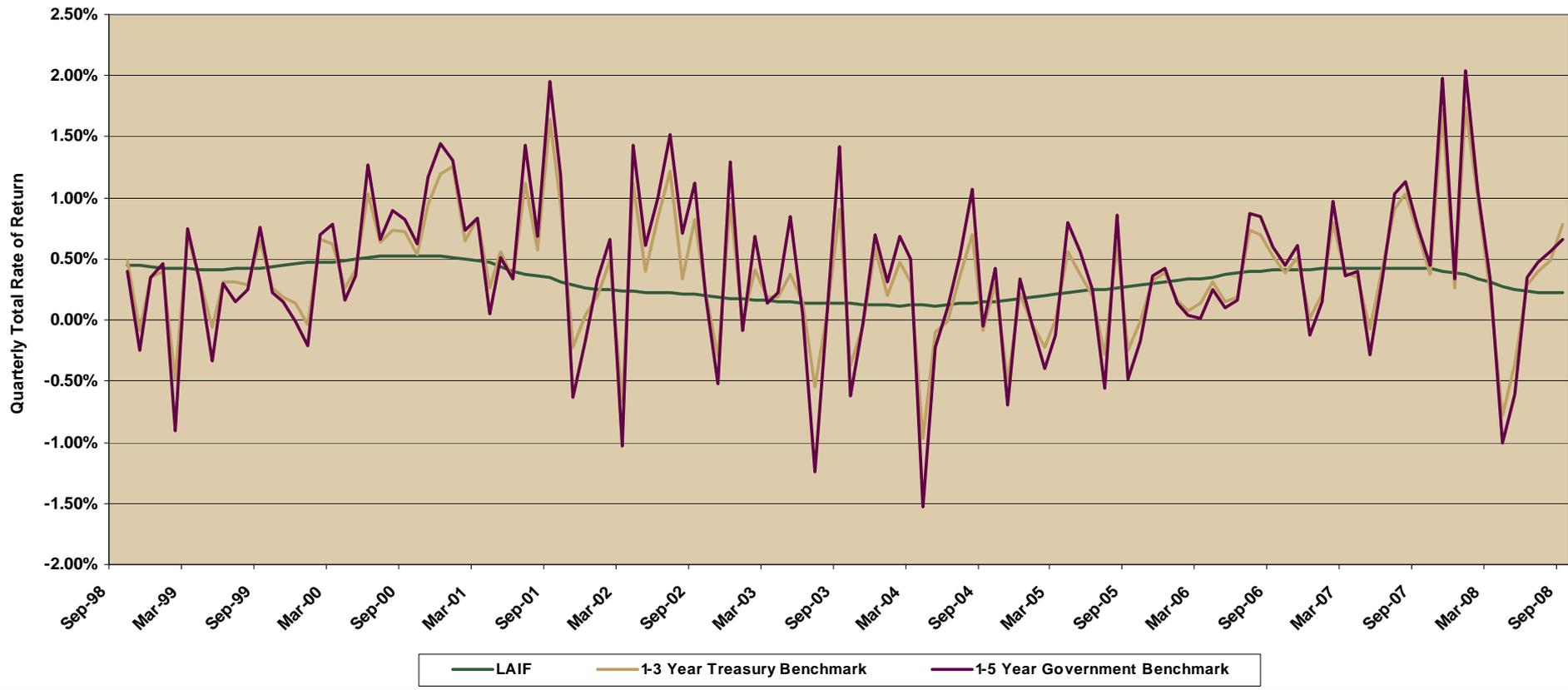
Greater risk = higher returns



Greater risk = higher volatility

Higher duration portfolios have greater volatility of return

Quarterly Change in Value



Choosing the portfolio's target duration

- Some considerations regarding exposure to market risk
 - Maintain short-term investments sufficient to meet cash needs
 - Analyze need for portfolio income and growth
 - Consider appetite for market value fluctuations (GASB 40 considerations)
 - Incorporate statutory and policy considerations
- Highest duration possible given risk tolerance and liquidity needs

Liquidity risk

■ Liquidity risk

1. The risk that the portfolio won't provide adequate cash flow for the agency
 2. The risk that a security can't be sold, if necessary, at a good price
 - ❑ Measured by such factors as the difference between bid and ask
 - ❑ Number of market makers for the issue
 - ❑ Usually, the larger the issue size, the greater the liquidity
- Liquidity risk can be minimized by maintaining appropriate balances of short-term securities in the portfolio

Reinvestment risk

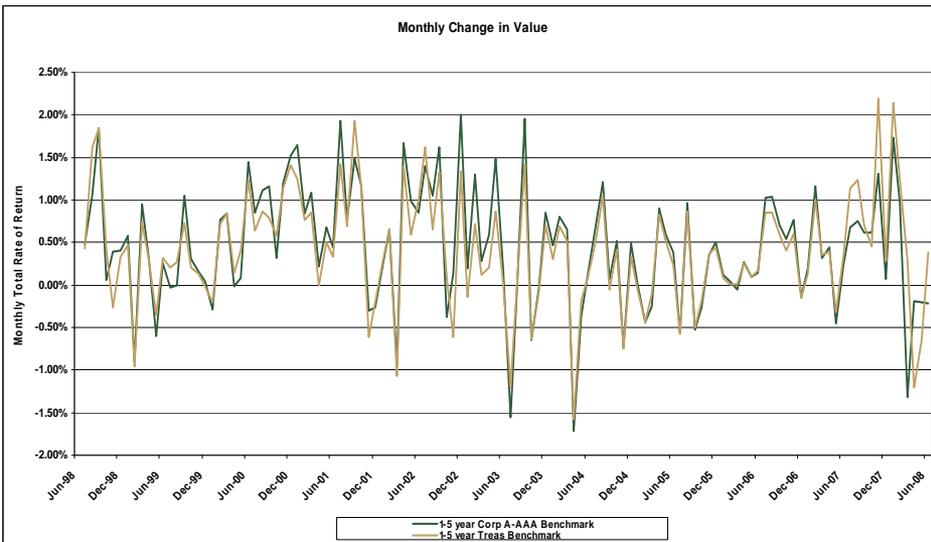
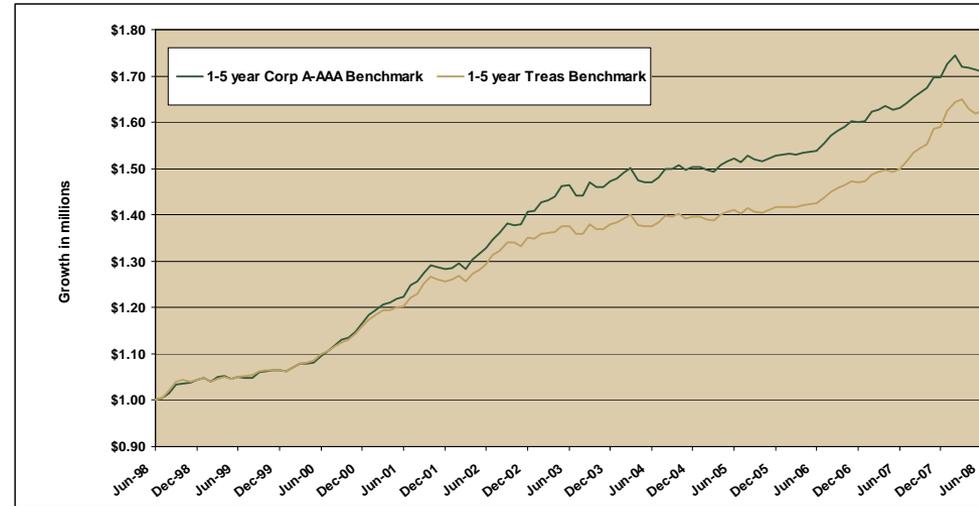
- ***Reinvestment risk:*** cash flows from a bond must be reinvested at the market rate at the time the cash flow occurs
 - Interest payments
 - Principal paid at maturity
 - Paydowns from mortgage securities
 - Principal from called bonds

Credit risk

- Investors receive higher yields when they purchase riskier securities
 - Agencies vs. Treasuries
 - Corporates vs. Agencies
 - “A” vs. “AAA” Corporates
- Credit ratings change over time
- Yield spreads vary over time

Credit risk — the opportunity

- Assuming additional credit risk should result in higher returns over time



- With a similar pattern of volatility of return

Managing credit risk

- Assuming credit risk requires that additional resources be devoted to the investment program
 - Moody's/S&P ratings, watch lists, outlook
 - At time of purchase and
 - On a regular basis
 - Supplemented by
 - Third party sources
 - Internally generated credit research

Measuring yield

- The yield on any investment is the interest rate that will make the present value of the cash flows from the investment equal to the price (or cost) of the investment
- Calculating yield requires a trial and error process to find the correct interest rate
- Fortunately financial calculators, computers, or Bloomberg terminals can do this for us
- Many different types of yields
- Make sure we compare apples to apples

Basic yield spread measures

- Most securities in the bond market are priced on a “spread”
- The spread represents the additional compensation necessary for holding a risky asset
- Risky securities are generally compared to Treasuries so the spread is the additional yield over a Treasury with a comparable maturity – this is known as a nominal spread
- Limitation: the nominal spread only measures one point on the Treasury curve

Advanced spread measures

- The zero-volatility spread (Z-spread) takes into account the entire yield curve and is more accurate than the nominal spread
- Option-adjusted spread (OAS) is a model that takes into account the future volatility of interest rates
- The OAS measure is appropriate for bonds with embedded options such as callable agency bonds or mortgage-backed bonds
- The OAS can be used to compare the relative merits of a callable and a non-callable bond
- All spread models are very sensitive to the underlying assumptions of the model and the inputs to the model

Portfolio management concepts

Strategy

Benchmarks

Measuring performance

Summary

Strategy

- The objectives of the investment program are to achieve safety, liquidity and yield
- The investment policy serves as the framework for implementing the investment program
- The investment strategy manages the portfolio with the proper risk profile
- The investment strategy is reflected in the choice of an appropriate benchmark
- Once chosen, the portfolio strategy should seldom change
- Tactical changes are made within the broader framework of the portfolio strategy

What is a benchmark?

- An unmanaged portfolio that includes similar securities and maturities to those that are permitted in the investment policy
- Examples
 - S&P 500 Index for stocks
 - LAIF
 - Index of 1-3 year government notes
 - Index of 1-5 year government and corporate securities rated “A” or higher

What makes a good benchmark?

- Constructed in a disciplined and objective manner
- Representative of assets in which the fund may invest
- Exhibit similar risk characteristics as the investment objectives
- Formulated from publicly available information
- Known in advance
- The information derived from both the benchmark and the portfolio should use the same calculation methods

Why use a benchmark?

- Monitor and maintain appropriate risk profile
- Duration management within defined band (e.g. +/- 10%)
- Imparts discipline on the investment process
- Helps measure the performance of the investment program during a given period
- Identifies why a portfolio performed better or worse than the broader market

Measuring performance

- Yield = income from current investments + projection of reinvestment income
 - Used to forecast income for line item in next year budget
 - And often, to compare portfolio return to a yield benchmark
- Realized return: Adds realized gains and losses
 - No realized return benchmark
 - Return information can be distorted
- Total rate of return
 - Incorporates all elements of return – income, realized and unrealized gains and losses, reinvestment of cash flows
 - Can be used to provide comparable results in a consistent format

Summary

- Have a plan and stick to the plan throughout market cycles
- Avoid interest rate forecasts and market timing
- Duration accounts for 80% of portfolio returns
- Conduct independent credit research and be aware of risks in your portfolio
- Information is an investors best friend

Resources: books

- Miller, Girard, *Investing Public Funds*, Second Edition, GFOA
- California Debt and Investment Advisory Commission, *California Public Fund Investment Primer*, CDIAC, 2004
- Wright, Sharon, *Getting Started in Bonds*, Second Edition, John Wiley & Sons, 2003
- Crescenzi, Anthony, *The Strategic Bond Investor*, McGraw-Hill, 2002
- Fabozzi, Frank, *Handbook on Fixed Income Securities*, Dow Jones, Irwin, 1987
- Stigum, Marcia and Fabozzi, Frank, *Dow Jones-Irwin Guide to Bond and Money Market Investments*, Dow Jones Irwin, 1987

Resources: websites

- Market information
 - www.bloomberg.com
 - www.cnbc.com
 - www.wsj.com
 - www.investinginbonds.com
- Research
 - www.muninetguide.com
 - www.moodys.com
 - www.standardandpoors.com
 - www.federalreserve.gov

Questions?



Biographical information

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Brian joined Chandler Asset Management in 2005 and currently serves as an investment strategist. In that role, Brian analyzes economic developments, conducts research on financial topics, and helps formulate investment strategy. Brian was also instrumental in creating a new quantitative corporate credit analysis program and in developing the firm's capital market forecasts and asset allocation models. Brian authors the monthly Chandler Bond Market Review, has contributed numerous articles to investment industry publications, and is a frequent presenter at industry association events.

Prior to joining Chandler, Brian worked as a fixed income trader for an investment bank, where he was responsible for trading government, corporate, and emerging market securities. In addition to developing trading strategies for over 700 securities salespeople, Brian managed a proprietary trading book consisting of relative value and market directional positions.

Brian has a BS Degree in Finance from Villanova University, an MBA in International Business from National University, and is pursuing an MA degree in International Affairs from Tufts University.